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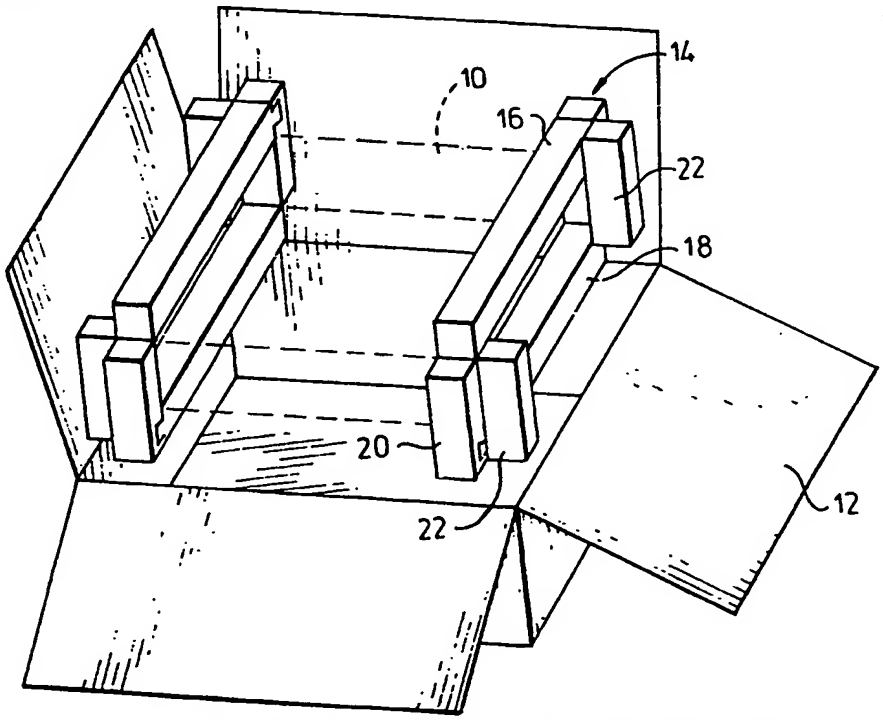
(54) Packaging fitments

(57) A packaging fitment 14 of plastics foam, is designed to support a rectangular inner box 10, containing a fragile product, within an outer box 12 so that the inner box 10 is suspended in a resilient and shock absorbing manner within the outer box and spaced from the walls of the latter. Each fitment 14 is formed by a combination of through cuts and partial cuts in a block of plastics foam such that by folding and bending respective regions of the piece thus cut from the foam, the fitment, ready for use, is produced.

Fig.1.



At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

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Fig.1.

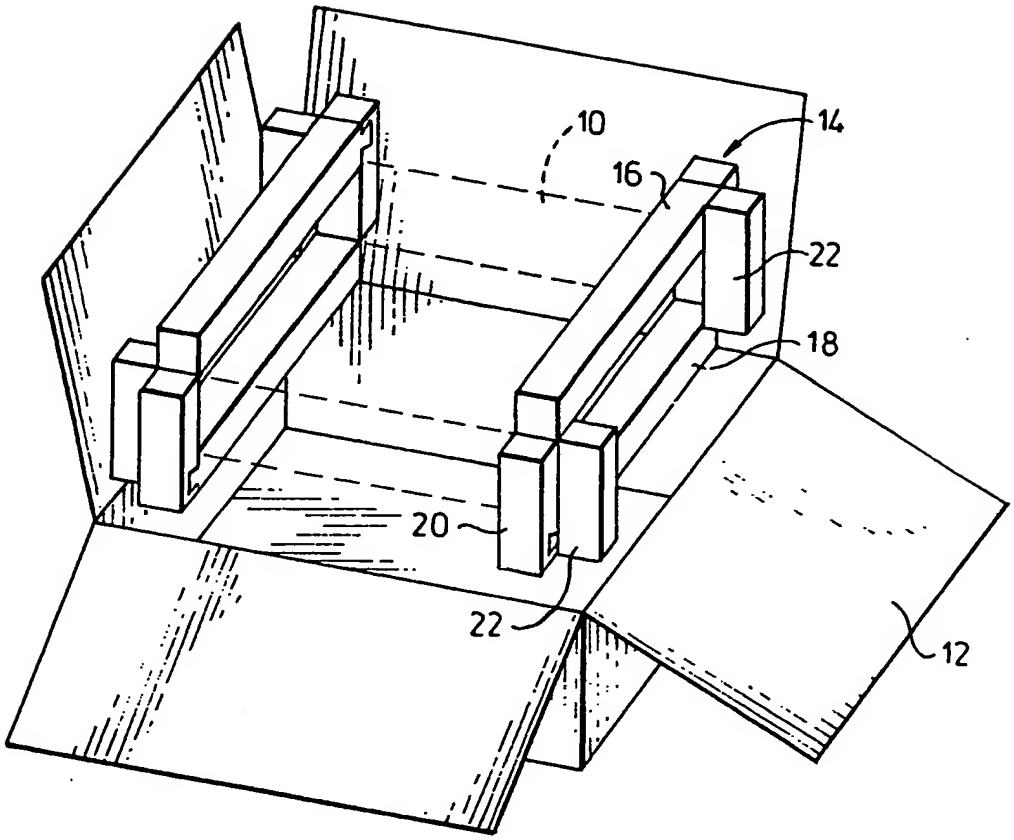


Fig.2.

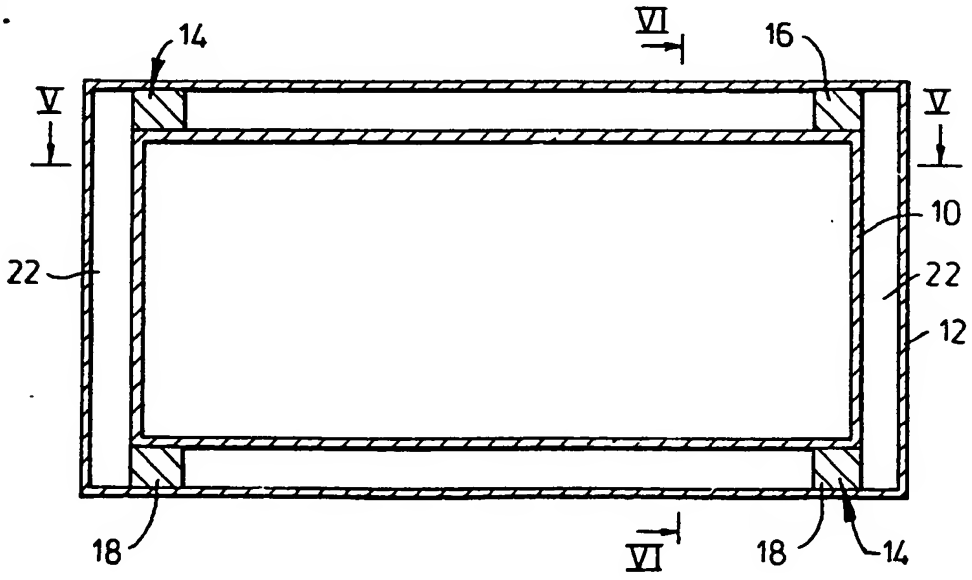


Fig.3.

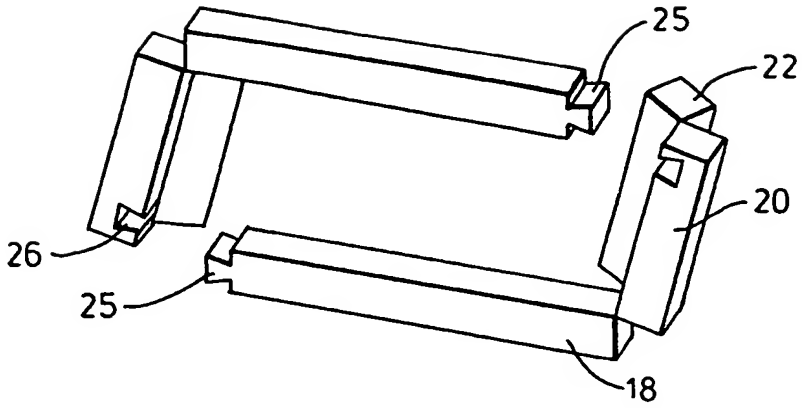


Fig.4.

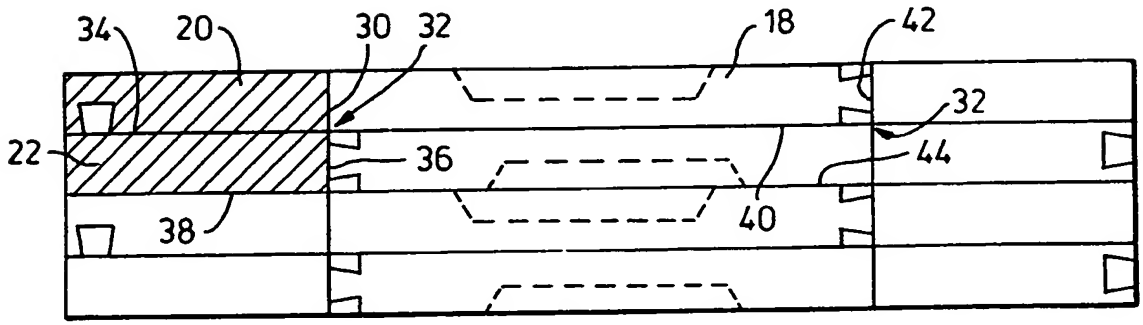


Fig.5.

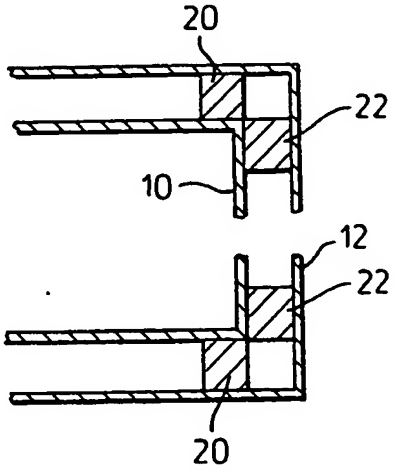
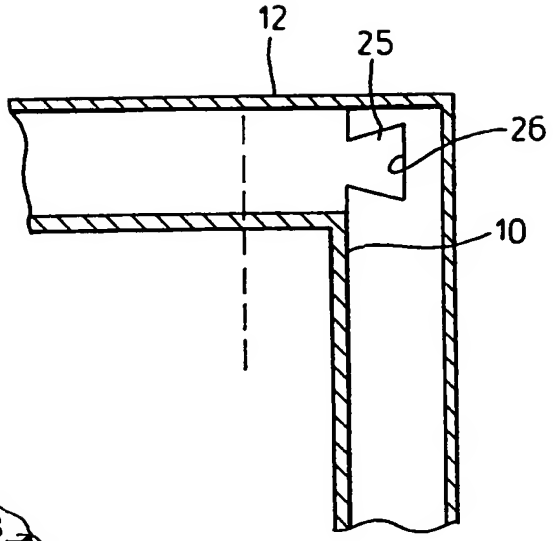


Fig.6.



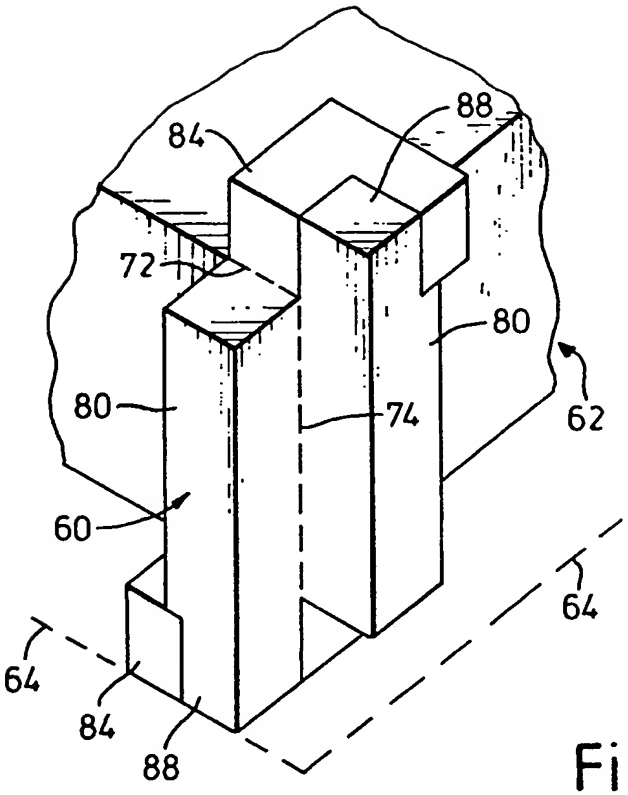
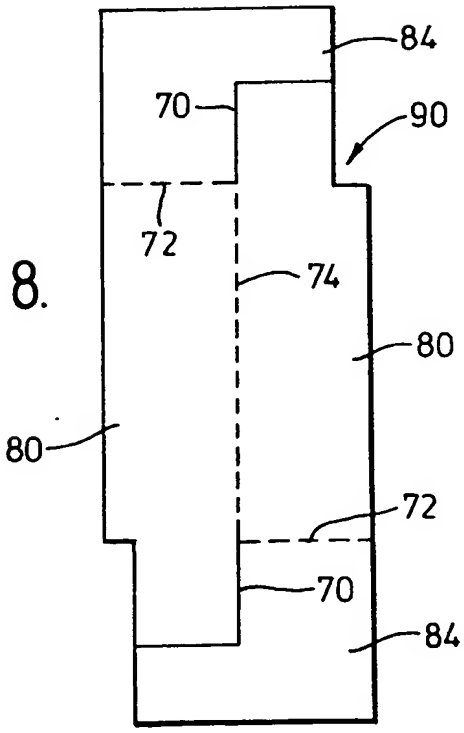


Fig.7.

Fig. 8.



DESCRIPTION OF INVENTION

Title: "Improvements in or relating to packaging"

THIS INVENTION relates to a packaging fitment for use in supporting an item within a container, so as to protect the item from impact and other forces to which the container is subject, for example in routine handling or by being accidentally dropped. The invention also relates to a method of manufacturing such a packaging fitment and to a package incorporating such a fitment.

It is known to pack items in packing cases or cardboard cartons in such a way that a shock-absorbing packaging medium within the packing case or carton is interposed between the item and the walls of the carton or packing case so that the item is spaced from said walls and is supported indirectly by said walls through the intermediary of the packing medium. Where relatively fragile items are to be packed, which must be protected from excessive accelerational or decelerational forces, as well as from direct impact, the shock-absorbing medium must act as a suspension arrangement having precisely controlled characteristics, and the suspension medium in such cases commonly comprises a structure of relatively complex configuration made from materials which are relatively expensive, such as closed-cell polyethylene foam, foam rubber or the like. Apart from the material cost of such a structure, the manufacture and assembly of such a shock absorbing structure around an item to be packed is generally fairly labour-intensive and may involve relatively expensive equipment and/or substantial wastage, for example in the form of off-cuts of the materials used.

It is among the objects of the present invention to provide an improved packaging fitment for use in supporting an item within a container, by which the above-noted drawbacks of known packaging arrangements may be minimised.

According to one aspect of the invention, there is provided a packaging fitment for use in supporting an item within a container in spaced relationship from the walls thereof, the fitment comprising an elongate shock-absorbing member adapted to be extended around the item to be supported and having one end capable of being readily secured to another end of said member after the latter has been so extended, whereby the member forms a ring or annulus extending around such item and projecting therefrom for engagement with the walls of such container.

According to another aspect of the invention, there is provided a packaging fitment for use in supporting an item within a container, comprising a shock-absorbing member which is in the form of a ring extended around such item, or capable of being extended in the form of a ring around said item, said member having along at least one section thereof a block of shock absorbing material hingedly connected with said section and adapted to extend over an adjoining end of said item.

According to yet another aspect of the invention, there is provided a packaging fitment for use in supporting an item within a container, comprising at least one unitary body of flexible shock absorbing material having a first hinge permitting folding of the body about a first axis to permit parts of said body on opposite sides of the first hinge to extend along adjacent faces of a box-shaped said item, said body including a further portion connected with one of said parts along a second hinge, permitting pivotal movement of said further portion with respect to said one of said parts about a second axis transverse to said first

axis, to permit said further portion to be extended over an end face adjoining such adjacent faces of such box-shaped item.

According to a further aspect there is provided a method of making a packaging fitment according to the preceding aspect, wherein said parts and said further portion are substantially in the form of oblong blocks, the method comprising providing a slab of shock-absorbing material, and cutting a plurality of said shock absorbing members from said slab by forming in the material, a plurality of incisions extending along parallel lines across the slab and a plurality of further incisions extending along parallel lines, along the slab, perpendicularly intersecting the parallel lines across the slab, some of said incisions extending entirely through the respective portions of the slab entirely, to separate said shock-absorbing members from the slab, and others of said incisions extending only partially through the respective portions of said slab to leave necks in the shock-absorbing material which can act as hinges.

According to a still further aspect of the invention, there is provided a method of making a packaging fitment comprising providing a slab of shock-absorbing material, and cutting said shock absorbing member from said slab by cutting means, whereby hinges are provided between adjacent sections of said shock-absorbing member by narrow necks left between cuts formed by said die, whereby the shock absorbing item cut from slab can be folded, about said hinges, around an item to be packed.

Preferably cutting of said slab is effected using a cutting die. However, the slab may be cut in some other way, for example by laser beam under microprocessor control.

The invention also extends to a package comprising a container, an item within said container, at least one fitment in accordance with the invention extended around the item within the container, and serving to space the item from the walls of the container and to support the item in the container.

An embodiment of the invention is described below by way of example with reference to the accompanying drawings, in which:-

FIGURE 1 is a partially-exploded perspective view of a package embodying the invention,

FIGURE 2 is a view in vertical section through the package of Figure 1 when fully closed,

FIGURE 3 is an exploded perspective view of a packing fitment embodying the invention,

FIGURE 4 is a plan view illustrating the manner in which a plurality of the fitments of Figure 3 may be cut from a slab,

FIGURE 5 is a fragmentary view in horizontal section of the package, along the line V-V of Figure 2,

FIGURE 6 is a fragmentary view of the package, to a larger scale, in section along the line VI-VI of Figure 2,

FIGURE 7 is a perspective view showing another form of packing fitment embodying the invention, and

FIGURE 8 is a plan view, similar to Figure 4, illustrating the manner in which the fitment of Figure 7 may be cut from a slab.

Referring to Figures 1, 2 and 5, the package illustrated comprises an inner rectangular box 10, an outer rectangular box 12 and two packing fitments 14 fitted around the box 10 within the box 12. Within the box 10 may be packed, in a manner not shown, the article or articles (not shown) to be stored or transported. The inner box 10 is supported by the fitments 14 with its top, bottom, side and end walls respectively parallel with and spaced from the top, bottom, side and end walls of the box 12. The fitments 14 are arranged adjacent the opposite ends of the box 10 and engage the adjoining interior surfaces of the box 12 to space the inner box 10 from the interior of the outer box 12.

In Figure 1, the inner box 10 is indicated only in dotted lines, whilst the outer box 12 is shown in an open condition and the assembly comprising the inner box 10 and packaging fitments 14 is shown raised from the outer box. Each packaging fitment 14 comprises an upper horizontal bar 16 extending across the top of the inner box 10, a lower horizontal bar 18 extending across the bottom of the inner box 10, respective side bars 20 extending over respective side faces of the inner box 10 from the lower bar 18 to the upper bar 16 and respective end bars 22, each connected with a respective bar 20 along a respective vertical edge and each engaging the adjoining end face of the box 10. Accordingly, in the completed package, the inner container 10 is kept spaced from the top of the outer box 12 by the upper bars 16 of the two fitments 14, is kept spaced from the bottom of the outer box 12 by the lower bars 18 of the two fitments 14, is kept spaced from the side walls of the outer container 12 by the side bars 20 of the two fitments 14 and is kept spaced from the end walls of the container 12 by the end bars 22. The respective bars 16 to 22 of the fitments 14 fit snugly between the respective opposing surfaces of the inner and outer boxes to prevent free movement in any direction of the inner box with respect to

the outer. The bars 16, 18, 20, 22 are all of substantially rectangular cross-section. The fitments 14 are preferably made of a resilient, shock-absorbing material such as closed cell polyethylene foam, foam rubber, or the like, so that the fitments 14 act as suspension members interposed between the inner and outer containers to absorb and damp out accelerational or decelerational forces applied via the outer container, for example, if the package is dropped or struck by another package. Such shock absorbing material is relatively expensive, and there is described below, with reference to Figures 3 and 4, a method of forming fitments 14, from a slab of shock-absorbent foam material which makes most efficient use of the material and eliminates or minimises wastage of the material.

Referring to Figure 3, in the arrangement shown, each fitment 14 comprises two identical integers, each affording a respective side bar 20, end bar 22 and top bar 16 or bottom bar 18, the side bar 20 and top bar 16 or bottom bar 18 being connected by an integral hinge extending perpendicular to their longitudinal dimensions (and, in the arrangement shown, parallel with the longitudinal edges of the boxes 10, 12). Each said integer also provides an end bar 22 connected with the respective bar 20 by an integral flex-hinge connecting contiguous longitudinal corner edges of the bars 20, 22. The free end of each top bar 18 and each bottom bar 16 is provided with a dovetail-shaped tongue 25 engageable in a correspondingly shaped slot 26 formed in the side bar 20 of the other integer of the two-integer fitment 14, as illustrated in Figure 6.

Referring to Figure 4, this illustrates, in plan, a part of a foam slab in which a pattern of incisions, in planes perpendicular to the plane of the Figure have been made to define the integers of two packing fitments 14, the incisions being represented by solid lines in Figure 4. The cross hatching in Figure 4 is used to identify one of the

two identical integers making up one of the packing fitments 14. It will be noted that the pattern of incisions which define such fitments is such that each such integer is nested with an identical, oppositely oriented integer in a substantially rectangular strip of a thickness corresponding to the thickness of the foam slab. As cut from the slab, each bar 18 or 16 is formed as a rectilinear extension of the associated bar 20 and delineated therefrom by a perpendicular incision 30 which separates the bars 16, 20 or 18, 20 but for a narrow hinge region, corresponding to the intersection points indicated by the arrows 32 in Figure 4, each such hinge permitting relative pivotal movement of the bar 20 and the bar 16 or 18, once separated from the slab, about an axis which extends perpendicular to the plane of Figure 4. For each integer, an incision 34, extending from one major surface of the foam slab, stops just short of the opposite major surface, whereby the respective bar 22 is separated from the respective bar 20 except for a narrow hinge strip extending along contiguous longitudinal corner edges of the thus-still-connected bars 20 and 22, whereby the bar 22 can be pivoted about the last noted hinge strip, out of the region between the planes of the major faces of the foam slab. The foam material is cut through entirely along the incision lines indicated at 36, 38, 40, 42 and 44 indicated in Figure 4 and along the corresponding incision lines for succeeding pairs of fitment integers to be cut from the slab.

All of the above-described incisions in the slab are preferably die-cut, using a die press with tools moved perpendicularly to the major faces of the foam to make the incisions. The die used comprises an array of die blades arranged with their operative edges along a grid of intersecting sets of parallel lines corresponding with the horizontal and vertical lines in Figure 4. The die is also arranged, at the same time as it makes the incisions corresponding to the horizontal and vertical lines in Figure

4, to make incisions defining the dovetail-shaped slots 26 and dovetail-shaped tongues 25, as shown in Figure 4. It will be appreciated from Figure 4 that the proportion of the slab which is wasted as off-cuts is minimal.

It will be appreciated that the tongues 25 and corresponding slots 26 need not be dovetail-shaped as illustrated, but may be of any other shape, capable of providing an interlocking connection, for example "T"-shaped or keyhole shaped.

Indeed, with certain materials, the tongues 25 and slots 26 may simply be of rectangular shape, and adapted to remain engaged by friction. Alternatively, adhesive, adhesive tape or some stapling or the like arrangement may be provided to afford connections between the free ends of bars 16, 18 and of the bars 20, but such expendients have the disadvantage of adding to the manual labour involved and diminishing one of the advantages of the invention.

It will be appreciated that whilst, in the arrangement described, the package comprises an inner box and an outer box, in addition to the fitments 14, in appropriate instances the inner box may be dispensed with, with the bars 16, 18, 20, 22 bearing directly on the packed article. However, it is envisaged that an inner and an outer box will generally be used.

The broken lines in Figure 4 illustrate areas which may be cut away so that the remaining bars 16, 18, form bridge-like structures which engage the outer box only in the region of the longitudinal corner edges. This technique may be used to modify the suspension characteristics of the fitments 14 allowing the "spring rate" or damping factor of the latter to be precisely tailored to any particular application. Such cut-away areas may, of course, be on the sides of the bars which face the inner box, or may be in the

form of discrete holes or notches, depending upon the characteristics required.

It is also contemplated that supplementary slots may be provided at other locations on the bars 16, 18, incompletely severing the latter to subdivide the bars, whereby the latter may be hinged at locations intermediate the ends of these bars so that, for example, a particular packaging fitment integer may be used, as shown, with another, identical integer, for one size of inner/outer box combination, or may be used alone, to form a complete integral annular packaging fitment for a smaller inner/outer box combination by folding each bar 16, 18 about its supplementary hinges and fitting the tongue 25 into the slot 26 of the same integer.

Figure 7 illustrates a further form of packaging fitment, indicated at 60, fitted to a vertical corner edge of an inner rectangular box, partly shown at 62 and fitting within a corner region of an outer rectangular box, (two edges only of which are indicated by broken lines 64 in Figure 7). Identical fitments 60 are fitted to the three other vertical corner edges of the inner box 62, within the corresponding corner regions of the outer box, whereby the inner box container is supported within the outer box, as in the foregoing embodiment, with each of its faces parallel with and spaced from the corresponding wall of the outer box. (The term "corner edge" as used herein is intended to denote an edge in which two adjacent faces of a box meet. Thus, if a corner is regarded as a point at which three adjacent faces of a box meet, each "corner edge" is terminated at each end by a respective corner).

As in the preceding embodiments, and as illustrated in Figure 8, each packaging fitment 60 is cut from a slab of resilient plastics foam, such as closed-cell polyethylene foam, by means, such as a cutting die, which also forms

incisions extending only partially through the foam material. In Figure 8, the L-shaped solid lines 70 denote incisions extending entirely through the plastics foam material, whilst the broken lines indicated at 72 and 74 indicate incisions which do not quite extend through the thickness of the material but leave relatively thin connecting webs which serve as integral hinges, (correspondingly denoted by references 72 and 74 in Figure 7).

Each fitment 60 comprises two elongate parallel bars 80 of rectangular cross section, pivotally connected with one another along integral hinge 74 coinciding with adjoining longitudinal edges of the bars 80, one major face of each of the bars 80 being engaged with a respective one of the walls of the inner box which meet in the corner edge to which the fitment 60 is applied. Each bar 80 has, at one end thereof, a L-shaped member 84, pivotally connected with the respective bar 80 along a respective integral hinge 72 which extends, substantially in the plane of the face of the respective bar 18 engaging the inner box, perpendicular to the hinge 74. Each L-shaped member 84 is swung over, about its hinge 72, to engage the adjoining upper or lower face of the inner box 62, the right-angled recess defined by the incisions 70 (Figure 8) receiving an extended portion 88 of the other bar 80. A respective rebate 90 cut in each bar 80 during the die cutting of the fitment from the foam slab, serves to receive the free arm of the respective L-shaped member 84. It will be appreciated that, in order to place the fitment 60 in the condition illustrated in Figure 7, it is necessary to resiliently deform the extension 88 of each bar 80 somewhat and to resiliently deform each L-shaped member 84 somewhat in order to extend each member 84 around the adjoining extension 88 in the manner indicated, the deformed parts recovering their original shapes after the position illustrated in Figure 7 has been reached, whereby the fitment will retain the form illustrated in Figure 7 in the absence of further substantial forces applied thereto.

Once the fitments 60 are applied to the inner box and the inner box fitted within the outer box, the form of each fitment 60 is, of course, further retained by the walls of the boxes.

Whilst, for convenience, the fitments 60 have been described above as being applied to the vertical corner edges of the inner box, appropriately dimensioned fitments 60 could, of course, be applied to any set of four parallel corner edges of an inner box to be packed within an outer box.

Referring again to Figure 8, it will be appreciated that in the die-cutting or equivalent process, the foam slab is also cut right through, along the solid boundary lines indicated in Figure 8, to sever each blank from the adjoining blanks. Having regard to the substantially rectangular form of the blank illustrated, a plurality of such blanks may be cut from a slab of the foam material, by a network of parallel vertical and horizontal incisions, with the only wastage being the portions removed from the rebates 90.

It will be understood from the above that each packaging item 60 performs the function of two conventional "corner caps", in that it covers two adjacent corners of the inner box.

It will be understood, of course, that a fitment performing the function of a single corner cap could be provided by a structure which, in effect, eliminated the lower half of the fitment illustrated in Figures 7 and 8.

CLAIMS

1. A packaging fitment for use in supporting an item within a container in spaced relationship from the walls thereof, the fitment comprising an elongate shock-absorbing member adapted to be extended around the item to be supported and having one end capable of being readily secured to another end of said member after the latter has been so extended, whereby the member forms a ring or annulus extending around such item and projecting therefrom for engagement with the walls of such container.

2. A packaging fitment according to claim 1 wherein said ends of said shock-absorbing member are provided with complementary interlocking formations.

3. A packaging fitment according to claim 1 or claim 2 wherein said shock-absorbing member comprises a plurality of discrete sections connected end to end by complementary interlocking formations.

4. A packaging fitment for use in supporting an item within a container, comprising a shock-absorbing member which is in the form of a ring extended around such item, or capable of being extended in the form of a ring around said item, said member having along at least one section thereof a block of shock absorbing material hingedly connected with said section and adapted to extend over an adjoining end of said item.

5. A packaging fitment for use in supporting an item within a container, comprising at least one unitary body of flexible shock absorbing material having a first hinge permitting folding of the body about a first axis to permit parts of said body on opposite sides of the first hinge to extend along adjacent faces of a box-shaped said item, said

body including a further portion connected with one of said parts along a second hinge, permitting pivotal movement of said further portion with respect to said one of said parts about a second axis transverse to said first axis, to permit said further portion to be extended over an end face adjoining such adjacent faces of such box-shaped item.

6. A method of making a packaging fitment according to any of claims 1 to 3 comprising providing a slab of shock-absorbing material, and cutting said shock absorbing member from said slab using a correspondingly formed die or other cutting means, whereby hinges are provided between adjacent sections of said shock-absorbing member by narrow necks left between cuts formed by said die or other cutting means, whereby the shock absorbing item cut from slab can be folded, about said hinges, around an item to be packed.

7. A method according to claim 6 when dependent on claim 2, wherein said interlocking formations are also cut by said die.

8. A method of making a packaging fitment according to claim 5, wherein said parts and said further portion are substantially in the form of oblong blocks, the method comprising providing a slab of shock-absorbing material, and cutting a plurality of said shock absorbing members from said slab by forming in the material, a plurality of incisions extending along parallel lines across the slab and a plurality of further incisions extending along parallel lines, along the slab, perpendicularly intersecting the parallel lines across the slab, some of said incisions extending entirely through the respective portions of the slab entirely, to separate said shock-absorbing members from the slab, and others of said incisions extending only partially through the respective portions of said slab to leave necks in the shock-absorbing material which can act as hinges.

9. A method of making a packaging fitment according to claim 5, wherein said parts and said further portion are substantially in the form of oblong blocks, the method comprising providing a slab of shock-absorbing material, and cutting a plurality of said shock absorbing members from said slab using a die which comprises an array of die blades arranged with their operative edges along a plurality of parallel lines and perpendicularly intersecting lines, some of said die blades being arranged to cut through the respective portions of said slab entirely, to separate said shock-absorbing members from the slab, and others of said die blades being arranged to cut through the respective portions of said slab only partially to leave necks in the shock-absorbing material which can act as hinges.

10. A method according to claim 8 or claim 9 wherein complementary formations, interengageable with each other at opposite ends of the shock absorbing members cut from said slab, are formed by correspondingly shaped die blades during the cutting operation.

11. A package comprising a container and at least one fitment according to claim 1 or claim 4 or made by the method of claim 6 or claim 8, extended around the item within the container and serving to space the item from the walls of the container and support the item in the container.

12. A packaging fitment according to claim 5 comprising two generally rectangular bars connected along a common edge by said first hinge, each said bar having a respective said further portion at one end connected therewith along a respective second hinge perpendicular to said first hinge, each said bar having at its other end a respective extension portion adjoining said further portion of the other said bar, and means being provided wherein when the fitment is placed in its operative configuration, the said further

portion hinged to each bar can be secured in position by engagement with the adjoining extension portion of the other said bar, whereby the fitment can perform the function of two conventional corner caps.

13. A packaging fitment substantially as hereinbefore described with reference to, and as shown in, Figures 1 to 6 of the accompanying drawings.

14. A packaging fitment substantially as hereinbefore described with reference to, and as shown in, Figures 7 and 8 of the accompanying drawings.

15. A method of making a packaging fitment substantially as hereinbefore described with reference to the accompanying drawings.

16. A package substantially as hereinbefore described with reference to, and as shown in, Figures 1, 2, 3, 5 and 6 of the accompanying drawings.

17. A package substantially as hereinbefore described with reference to, and as shown in, Figures 7 and 8 of the accompanying drawings.

18. Any novel feature or combination of features described herein.

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